DOCUMENT RESUME

ED 095 421 CE 001 990

TITLE	Functional Drafting, Drafting--Intermediate: 9255.02.
INSTITUTION	Dade County Public Schools, Miami, Fla.
PUB DATE	Dec 72
NOTE	20p.; An Authorized Course of Instruction for the Quinmester Program
EDRS PRICE	MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS	Behavioral Objectives; Course Content; Course Descriptions; *Curriculum Guides; *Drafting; *Graphic Arts; Industrial Arts; Secondary Grades; Shop Curriculum; Technical Education; *Trade and Industrial Education; *Vocational Education
IDENTIFIERS	Functional Drafting; *Quinmester Program

ABSTRACT

The course consists of six instructional blocks totaling 135 clock hours: (1) functional drafting, (2) threads and fasteners, (3) pictorial drawings, (4) introduction to electronic drafting, (5) introduction to piping drafting, and (6) Quinmester posttest. Mastery of skills indicated in Drafting-Basic--9255.01 is a prerequisite. In the functional drafting course, the student is also introduced to various types of tools and equipment and is provided with an opportunity for instruction and laboratory experiences. An adjunct to the listed instructional methods is provided through the instructor's utilization of audiovisual equipment and materials. The bibliography lists the basic reference, workbooks, and supplementary references used by the teacher in presenting the material. (Author/MW)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

DADE COUNTY PUBLIC SCHOOLS

√-7

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Course Outline
DRAFTING - INTERMEDIATE - 9255
(Functional Drafting)
Department 45, 48 - Quin 9255.02

DIVISION OF INSTRUCTION • 1973

ED 095421

D A D E C O U N T Y P U B L I C S C H O O L S

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Course Outline

DRAFTING - INTERMEDIATE - 9255
(Functional Drafting)

Department 45, 48 - Quin 9255.02

county office of

VOCATIONAL AND ADULT EDUCATION

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Dade County Public Schools
Miami, Florida 33132

December, 1972

Published by the School Board of Dade County

Course Description

9255	45, 48	9255.02	Functional Drafting
State Category Number	County Dept. Number	County Course Number	Course Title

This is a course in functional drafting incorporating screw threads and fasteners. The student will also become familiar with pictorial drawings such as isometric, oblique and perspective views as related to electronic and piping drawings.

Indicators of Success: Prior to entry into this course, the vocational student will display mastery of the skills indicated in Introduction to Basic Drafting - 9255.01.

Clock Hours: 135

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PREFACE

The following quinmester course outline is presented as an introduction to functional drafting. It covers pictorial drawings, screw threads and fasteners, piping drafting and electronic drafting. The student is also introduced to various types of tools and equipment and is provided with an opportunity for instruction and laboratory experiences.

Mastery of skills indicated in "Introduction to Basic Drafting - 9055.01" is a prerequisite.

This course is taught in a two-hour block for 90 hours or a three-hour block for 135 hours. In each instance, the course consists of six instructional blocks which are further subdivided into several units each. The three-hour session permits the learner to cover each block in more detail and also provides additional opportunity to practice and increase his or her skills. The course is concluded by a post-test.

An adjunct to the listed instructional methods is provided through the instructor's utilization of audiovidual equipment and materials.

The bibliography lists the basic reference, workbooks and supplementary references used by the teacher in presenting the material. These books are available to the sudent through the instructor.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

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With Suggested Hourly Breakdown

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Vital Point	1
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Screw Threads	1
Threaded Fasteners	1
Keys	2
Rivets	2
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GOALS

The student must be able to demonstrate:

1. The ability to develop and direct his or her activities along lines parallel to present day drafting practice.

2. Skills in the selection and handling of tools and equipment through organized practice sessions in the related field of fasteners of all types.

3. The skills needed to perform as a draftsman with assigned tasks that may require pictorial drafting.

4. The ability to advance his knowledge and skills in drafting to meet the requirements of the electrical and electronic industry.

5. The desire for advancement in his chosen vocation by introducing and keeping before him achievements of leading machine designers, engineers and draftsmen, especially in the piping field.

6. The use of tools and equipment to perform a task in a predetermined length of time and to the satisfaction of a drawing checker.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - FUNCTIONAL DRAFTING

The student must be able to:

1. Discuss the "Vital Point" as related to working drawings.
2. Explain two facts very important to functional drafting.
3. Construct all future drawings along the guide line of functional drafting.
4. List the 12 basic rules or steps for functional drafting.

BLOCK II - THREADS AND FASTENERS

The student must be able to:

1. Demonstrate the skills needed to use the proper call outs and drawing symbols that are used in screw thread fasteners.
2. Label and exhibit the ability to discuss the nomenclature of most common type screw threads, along with standard pipe threads.
3. Demonstrate an understanding of most common type threaded fasteners and be able to place them in a bill of material and become familiar with the material, size and quantity.
4. Demonstrate an understanding of various types of keys, have the knowledge of where to find these specifications in reference material and be able to apply this information to the drawing he is constructing.
5. Determine when and where to use rivets and what rivets are best suited to the job at hand.
6. List various types of rivets used in the industry and their use in the field or shop.
7. Prepare drawings that call for various types of rivets.

BLOCK III - PICTORIAL DRAWINGS

The student must be able to:

1. Construct isometric pictorial drawings where they are needed and be able to understand their function in the world of engineering and design.
2. Use these drawings and sketches where they are necessary and understand why he is making this type of drawing.
3. Exhibit the ability to draw and sketch oblique drawings and know why he is doing this type of drafting and for what reason he is using the pictorial method of communication.
4. Demonstrate an understanding of the theory and laboratory experiences in one-point perspective drawing and use this type of drawing where necessary.
5. Prepare two-point perspective drawings and sketches where necessary and become proficient at this type of drafting.

BLOCK IV - INTRODUCTION TO ELECTRONIC DRAFTING

The student must be able to:

1. Erect various types of electronic drawings and become familiar with the trade in general.
2. Draw schematic diagrams and learn the component symbols but also become familiar with all the types of drawings used by the electronics industry.

BLOCK V - INTRODUCTION TO PIPING DRAFTING

The student must be able to:

1. Draw various types of piping drawings and become familiar with the trade in general.
2. Learn the various types of pipes and fittings and the standard code for pressure.

BLOCK VI - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

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Course Outline

DRAFTING - INTERMEDIATE - 9255
(Functional Drafting)

Department 45, 48 - Quin 9255.02

I. FUNCTIONAL DRAFTING

- A. Vital Point
  - 1. Definition
  - 2. Importance
- B. Simplification
  - 1. Definition
  - 2. Types
    - a. Repetitive details
    - b. Unnecessary details
    - c. Assembly drawings - simple
    - d. Simple parts on a list
    - e. Symmetry
      - (1) Definition
      - (2) Use of
    - f. Symbols
      - (1) Definition
      - (2) Use of

II. THREADS AND FASTENERS

- A. Screw Threads
  - 1. Drawing
  - 2. Labeling
    - a. Representation
    - b. Nomenclature
  - 3. Types
    - a. American Standard
    - b. Left and right
    - c. Miscellaneous
    - d. Pipe
- B. Threaded Fasteners
  - 1. Drawing
  - 2. Calling out
    - a. Size
    - b. Material
    - c. Quantity
    - d. Remarks
  - 3. Types
    - a. Definitions
    - b. Use of
    - c. Reasons
    - d. Miscellaneous

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C. Keys
   1. Types
      a. Square
      b. Pratt and Whitney
      c. Woodruff
      d. Machine pins
   2. Use of

D. Rivets
   1. Types
      a. Button head
      b. Cone head
      c. Pan head
      d. Flat head
      e. Round head
   2. Use of
   3. Drawn

III. PICTORIAL DRAWINGS

A. Isometric
   1. Projections
      a. Definition
      b. Constructions procedure
      c. Use of
         (1) Pictorial
         (2) Illustration
   2. Drawing
      a. 30° Y-Axes method
         (1) First position
         (2) Second position
         (3) Reverse axes
      b. Elements
         (1) Lines
         (2) Planes
         (3) Diagonals
         (4) Circles
   3. Sketching
      a. Use of
         (1) Preliminary design
         (2) Inventing
      b. Field use

B. Oblique
   1. Projections
      a. Definition
      b. Construction procedure
      c. Use of
         (1) Pictorial
         (2) Illustration
         (3) Conditions
   2. Drawings
      a. Planning diagonal construction
      b. Elements
         (1) Lines

III. PICTORIAL DRAWINGS (Contd.)

(2) Planes
(3) Diagonals
(4) Circles
c. Planning curvilinear
3. Sketching
a. Use of
(1) Preliminary design
(2) Inventing
b. Field use

C. One-Point Perspective
1. Projection
a. Using fundamental optical laws
b. Nomenclature of lines and points
(1) Horizon
(2) Ground line
(3) Station point
(4) Picture plane
(5) Center vision point
c. Resolving views
d. Procedure of construction
e. Projection procedure
f. One-Point limits
(1) Not pleasing
(2) Interior illustration
2. Drawing
a. Selecting station
b. Planning basic layout
c. Elements
(1) Lines
(2) Planes
(3) Diagonals
(4) Circles

D. Two-Point Perspective
1. Projection
a. Planning location of two points
b. Executing two point development
c. Nomenclature of lines and points
(1) Ground line
(2) Station point
(3) Horizon
(4) Right and left vanishing points
(5) Picture plane
d. Projection procedure
e. Procedure of development
f. Two point limits
2. Drawing
a. Planning basic layout
b. Executing basic layout
c. Elements
(1) Lines

(2) Planes
(3) Diagonal
(4) Circular

IV. INTRODUCTION TO ELECTRONIC DRAFTING

A. Introduction
1. Types of drawings
a. Electrical
(1) Engineering sketch
(2) Block diagram
(3) Tabular
(4) Schematic
(5) Wiring diagram
(6) Printed circuit
b. Mechanical
(1) Layout
(2) Assembly
(3) Detail
(4) Installation
c. Graphic
(1) Charts
(2) Graphs
(3) Monograms
2. Tools and equipment
a. Templates
b. Tape up

B. Symbols
1. Drawing
2. Use of
3. Component values

V. INTRODUCTION TO PIPING DRAFTING

A. Types
1. Schematics
2. Isometric
3. Oblique
4. Detail
5. Installation

B. Identification
1. Types of pipe
2. Fittings
3. American Standard code for pressure

C. Symbols
1. One line
2. Two line

VI. QUINMESTER POST-TEST

BIBLIOGRAPHY
(Functional Drafting)

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Basic References:

1. French, Thomas E. and Svensen, Carl L. Mechanical Drawing. 6th ed. New York: McGraw-Hill Book Company, Inc., 1957. Pp. 568.

2. _____. Mechanical Drawing. 7th ed. New York: McGraw-Hill Book Company, Inc., 1966. Pp. 570.

3. Spencer, Henry C. Basic Technical Drawing. Rev. ed. New York: Macmillan Company, 1962. Pp. 370.

Supplementary References:

4. French, Thomas E. and Vierck, Charles J. Engineering Drawing. 10th ed. New York: McGraw-Hill Book Company, Inc., 1966. Pp. 850.

5. Fuller, Don. Functional Drafting for Today. Boston: Industrial Education Institute, Fransworth Publishing, Inc., 1966. n.p.

6. Rotmans, Elmer A. Drafting Simplified. Rev.ed. Albany, New York: Delmar Publishing Company, Inc., 1950. Pp. 397.

7. United States Department of Defense. Military Standard. Mil-Std-8C. Washington, D. C.: U. S. Government Printing Office, 1963. Pp. 84.

8. _____. Military Standard. Mil-Std-12B, Rev. ed. Washington, D. C.: U. S. Government Printing Office, 1959. Pp. 101.

9. _____. Military Standard. Mil-Std-100. Washington, D. C.: U. S. Government Printing Office, 1965. Pp. 138.

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APPENDIX

QUINMESTER POST-TEST SAMPLE

Quinmester Post-Test

Name _____ Date _____ Score _____

True-False Test Items

Each of the following statements is either true or false. If the statement is true, draw a circle around the letter T following it; if the statement is false, draw a circle around the F. If a statement is false in part it is entirely false.

1. If it is easier to draw, don't describe it. T F
2. The words "drill", "ream", etc. are used in machine drafting to avoid mistakes made by the machinist. T F
3. Excessive dimensions are acceptable to assure the builder's having enough information to produce the part. T F
4. Always bear in mind who will use the drawing and for what. T F
5. Question the necessity for projected views. A description, a note or a reference may be all that is needed. T F
6. Always use dotted lines for clarification. T F
7. It may not be necessary to see the total picture; apply symmetry wherever applicable. T F
8. Many fabrication details are necessary; a draftsman has to relay this information to the shop in detail. T F
9. Keep assembly drawings simple, omitting unnecessary details. T F
10. Templates are costly and hard to keep clean and should not be used unless absolutely necessary. T F

Completion Test Items

Fill in the blank or blanks with the word or words that make the statement correct.

1. Standard type fasteners such as "on-the-shelf" bolts and washers should not be detailed but called out in the _____.
2. National Pipe Thread is a standard for cutting or rolling threads on a pipe; this type of thread is called a _____ thread.
3. The fastening device usually used to secure a shaft to a gear or pulley is a _____.

4. There are many types of rivets used in the industry and the hot rivets are used for bridge or structural trades but the aircraft industry uses _____ rivets almost exclusively.

5. Cutting threads on a shaft is done with a die; the same operation for an inside hole is done with a drill and _____.

Multiple Choice Test Items

Each statement needs a word, a figure or a phrase to make it correct. Only one of the choices listed is correct. Place the letter of the choice you make in the space provided at the left.

___ 1. Piping schematic drawings are:

a. Orthographic views
b. Sketches
c. Isometric pictorial views
d. Three view drawings
e. None of the above

___ 2. Isometric drawings are drawn:

a. With ink
b. At 30^{o}
c. At 45^{o}
d. With three views
e. None of the above

___ 3. Oblique drawings are drawn:

a. With ink
b. At 30^{o}
c. With three views
d. With two views only
e. None of the above

___ 4. Sketching oblique and isometric drawings:

a. Is useful to engineers
b. Is an aid to designers
c. Almost depicts third dimension
d. Is an aid to field work
e. All of the above

___ 5. Nomenclature for one point perspective views is:

a. Horizon line
b. Ground line
c. Station point
d. Picture lane
e. All of the above

Performance Test

Each student will perform the assigned task at his own work station. He will have enough equipment to complete the task. There will be no talking and the student can leave his work station only to use the reference area. The assigned model or machine part will be placed on the student's drawing board.

The student will perform operation A and B in any order he desires.

Operation A

1. Sketch the model or part.
2. Use either isometric or oblique pictorial views.
3. Place necessary dimensions on drawing.
4. Specify material and make any remarks or give any information you think necessary to have the part manufactured.

Operation B

1. Show part in three views using the orthographic projection method.
2. Place dimensions where they will be used to the best advantage.
3. Use the standard title block and bill of material.
4. Specify all information necessary to have the part produced.

Essay Test Items

Provide the following information in the space provided.

1. Types of drawings used.

2. Types of pipe.

3. Fittings.

4. American Standard code for pressure.

5. One line or two line drafting.

ANSWER KEY TO QUINMESTER POST-TEST

True-False Test Items

1. F
2. F
3. F
4. T
5. T
6. F
7. T
8. F
9. T
10. F

Completion Test Items

1. Bill of material
2. Taper
3. Key
4. Cold or ice box
5. Tap

Multiple Choice Test Items

1. c
2. b
3. b
4. e
5. e

Performance Test

Check the sketch and drawing as the regular work is checked using the normal check list.

Suggested check list rates accuracy, lettering, dimensioning, neatness, instruction and line work.

Check for completeness.

Essay Test Items

Check answers for completeness of facts and content.